

ARDASHEV, G.R.; MIKHAYLOV, I.N.; ZAMORSKIY, V.V.; DOVGICH, I.A.;
SEVERNEV, I.M.; DOMAN'KOV, V.M.; Primalni uchastiye:
FEDOSOV, I.M.; KRIVENKO, P.M.; KUDRYAVTSEV, P.R.;
BARABANOV, V.Ye.; BRIL', E.P., red.; PARSHIN, V.G., tekhn.
red.

[Technical maintenance of the KD-35, KDP-35, and T38
tractors] Tekhnicheskii ukhod za traktorami KD-35, KDP-35
i T38. Moskva, Biuro tekhn.informatsii GOSNITI, 1962. 153 p.
(MIRA 16:10)

1. Russia 1923- U.S.S.R.) Ministerstvo sel'skogo khozyaystva. 2. Gosudarstvennyy vsesoyuznyy nauchno-issledovatel'skiy tekhnologicheskii institut remonta i ekspluatatsii mashinno-traktornogo parka (for Ardashev, Mikhaylov, Fedosov, Krivenko, Kudryavtsev, Barabanov). 3. Ukrainskiy nauchno-issledovatel'skiy institut mekhanizatsii i elektrifikatsii sel'skogo khozyaystva (for Zamorskiy Dvgich). 4. Beloruskiy nauchno-issledovatel'skiy institut mekhanizatsii i elektrifikatsii sel'skogo khozyaystva (for Severnev, Doman'kov).
(Tractors--Maintenance and repair)

SEVERNEV, M.M.; DOMAN'KOV, V.M.; IODO, I.I.; CHERKASSKIY, A.G.

Substantiation for the tractor maintenance system. Sbor. rab. GOSNITI
no.17:8-18 '62. (MIRA 17:9)

SEVERNYAK, S.

On the roads of Bulgaria. Avt.dor. 26 no.4:32-3 of cover Ap '63.
(MIRA 16:4)

(Bulgaria--Roads)

SEVERIN, A. E.

"Meteors and the Upper Layers of the Atmosphere"
Astronomicheskii Zhurnal, Vol. 11, No. 2 1934 132-138.

Translation 563469

CR

1ST AND 2ND CODES

PROCESSES AND PRIORITIES INDEX

The evolution of stars and the variation of the relative abundance of hydrogen. A. Severnui. *Astron. Zhur.* 12, 33 (1935).--The "evolution" of stars is not merely a matter of H abundance but is a true evolution.

P. H. Rathmann

3

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ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

RECORD NO.

ISSUES

REVISION

1ST AND 2ND CODES

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PROCESSES AND PROPERTIES INDEX

The influence of sound-wave frequency on fog particles. S. V. Gorbachev and A. B. Severnui. *J. Phys. Chem.* (U. S. S. R.) 7, 536-45 (1955).—The effect of various sound-wave frequencies on fog streams of various concns. and at various velocities through air was studied. Absorption of sound is proportional to the square of the frequency and is less, the greater the diam. of the fog particles. The app. used is described in great detail. F. H. Rathmann

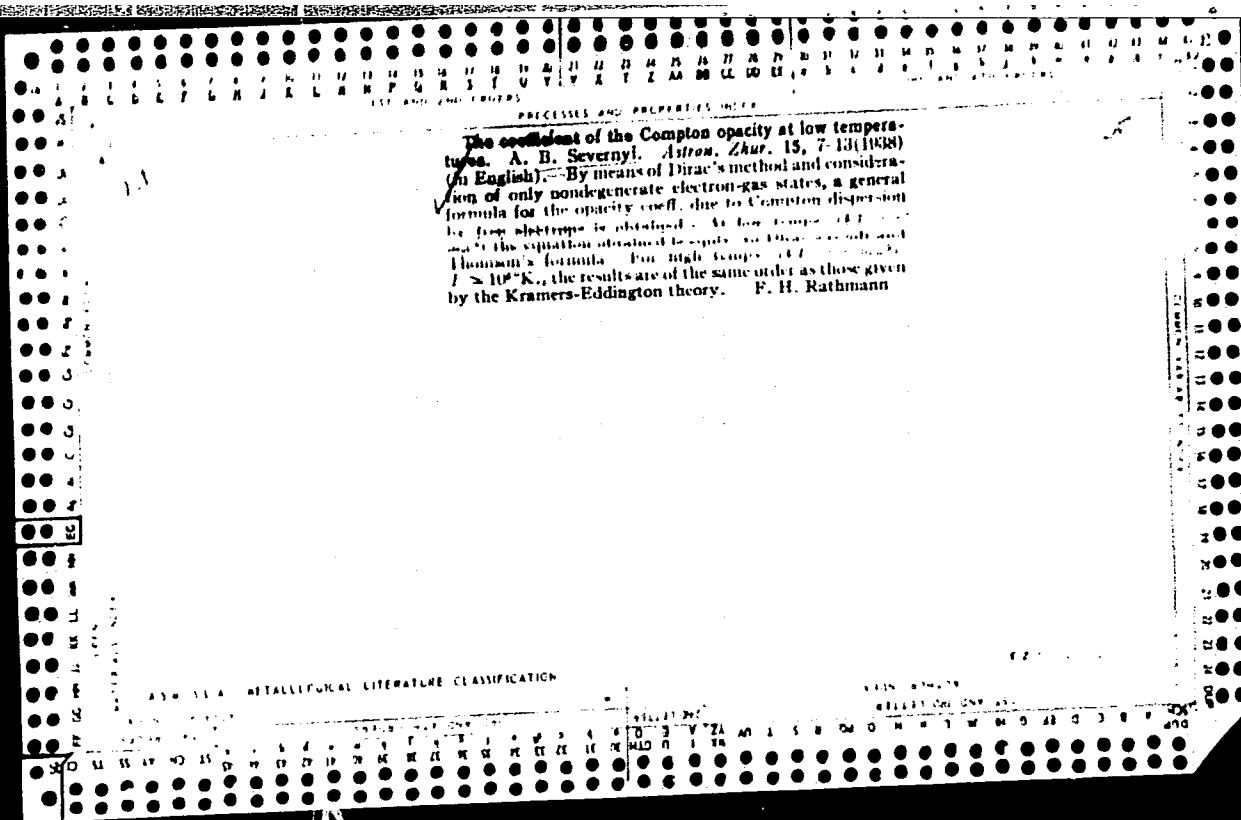
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| <p>66. Dissociation of the Degenerate Gas. A. B. Severny and N. N. Tunitsky. <i>Phys. Zeits. d. Sowjetunion</i>, 12, 3, pp. 330-333, 1957. In English.—In this paper are given the conditions of equilibrium in the reaction of degenerate gas subordinated to the Fermi-Dirac and Bose-Einstein statistics.</p> <p style="text-align: right;">AUTHORS.</p> | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>ASH 35.4 METALLURGICAL LITERATURE CLASSIFICATION</p> | | | | | | | | | | | | | | | | | | | | | | | | | |

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| <p>Intensity of telluric oxygen and nitrogen bands. A. B. Severnyl. <i>J. Exptl. Theoret. Phys.</i> (U. S. S. R.) 8, 150-62(1938).—Data are given on the α-band of O (λ 5380-7710A.) and on the auroral mol. bands of N₂, and the concn. of atoms causing them is calcd. The atm. temp. cannot be calcd. from these data as the causative processes are specific excitations of vibrational transitions.</p> <p>E. H. Rathmann</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <table border="1"> <thead> <tr> <th colspan="13">IRON-STEEL</th> <th colspan="13">ALUMINUM</th> </tr> <tr> <th colspan="13">IRON-STEEL</th> <th colspan="13">ALUMINUM</th> </tr> </thead> <tbody> <tr> <td colspan="13">IRON-STEEL</td> <td colspan="13">ALUMINUM</td> </tr> </tbody> </table> | | | | | | | | | | | | | | | | | | | | | | | | | | IRON-STEEL | | | | | | | | | | | | | ALUMINUM | | | | | | | | | | | | | IRON-STEEL | | | | | | | | | | | | | ALUMINUM | | | | | | | | | | | | | IRON-STEEL | | | | | | | | | | | | | ALUMINUM | | | | | | | | | | | | |
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12

Methods of determining the temperature of the earth's atmosphere from band spectra. A. B. Severnyi. *Astron. Zhur.* 15, 328-50 (1938) (in English, 350-51).—When the temp. of the earth's atm. is detd. from data on the equiv widths of the absorption bands via Einstein's equation spectrophotometric absorption coeffs. and Childs' data (cf. C. A. 27, 3697) on the transitions $0 \rightarrow 0$ and $0 \rightarrow 1$, the value $T_{\text{atm}} \approx 550^\circ\text{K}$. is obtained. The value obtained from the rotation spectrum of the α -band of O, with data of Mücke and Childs (cf. C. A. 25, 4792), is $T_{\text{atm}} = 270.2^\circ\text{K}$. S. believes that T_{atm} really characterizes not the mean thermal state but specific mol. excitations. F. H. Rothmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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PROCESS AND PROPERTIES INDEX

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SA

A 52

3594. Compton Scattering on Radiation in a Star. A. B. Severny. *Comptes Rendus (Doklady) de l'Acad. des Sciences, U.S.S.R.* 19:172, pp. 45-48, 1938. In English.—The absorption of radiation due to Compton scattering by free electrons of stellar matter is calculated for the case that a central region of a star radiates photons of the energy $h\nu \gg m_0c^2$. This region is surrounded by matter of the temperature $AT \ll m_0c^2$, and the free-electrons obey the laws of the Fermi statistics. It follows from the calculations that the absorption of radiation due to Compton scattering is small as compared with the photoelectric absorption for temperatures $T < 10^{100}$ K. The two absorptions become comparable if the temperature of the enveloping matter and of the core are $\sim 10^{100}$ K. and higher. The optical depths τ for the Compton absorption will be $\tau = 10^8$ for giants with radii $\sim 10^{12}$ cm., $\tau = 10^9$ for the sun, $\tau = 10^3$ for white dwarfs provided that the non-degenerate layers of the enveloping gas have each a linear depth of about one-tenth of the radius. It follows that penetrating radiation, formed in the centre of a star, passes through the surrounding matter in a negligibly small time out into space.

L. K.

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

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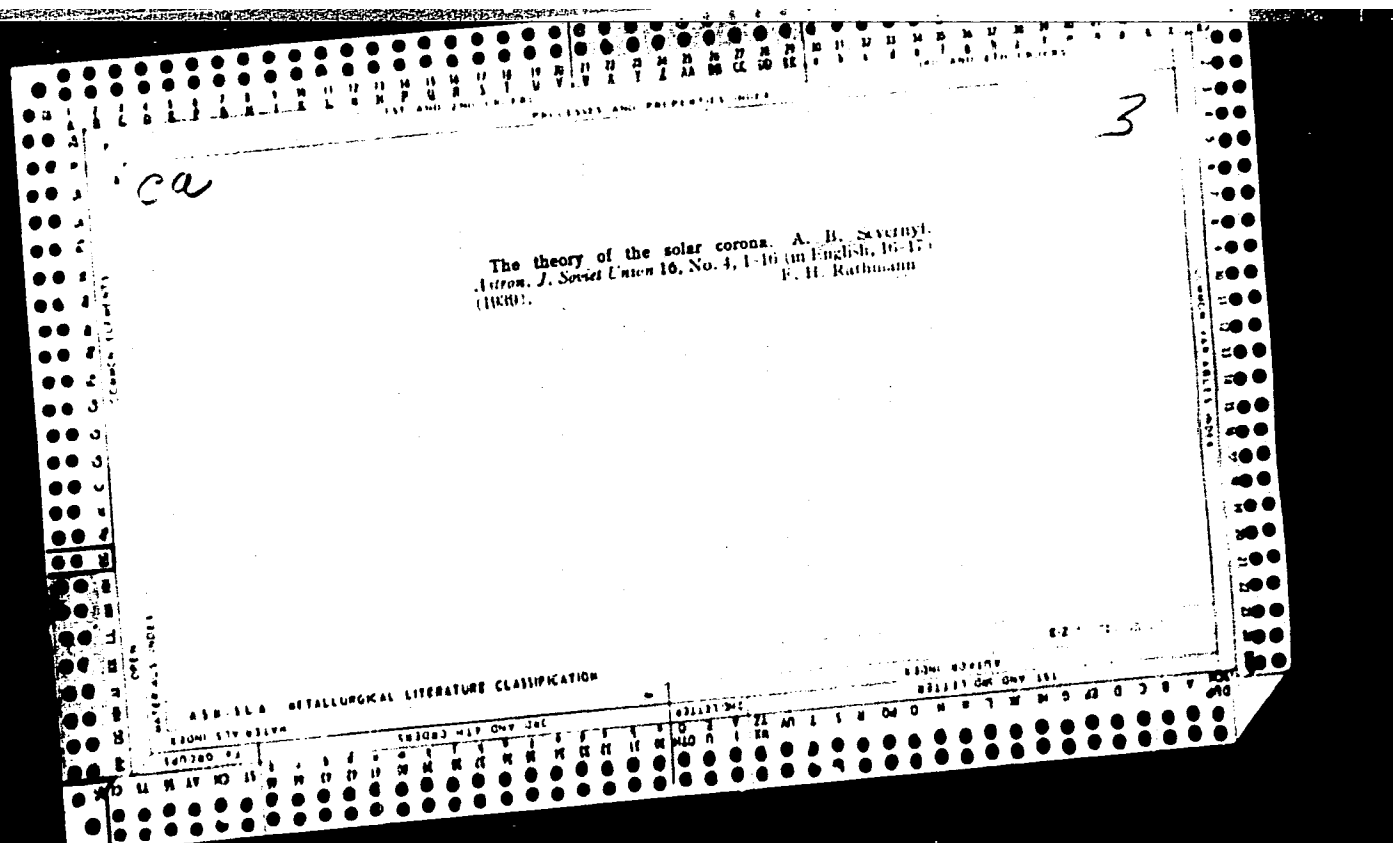
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CELLSTONE

CELLIST ONE ONE 151



SEVERNYY, A . B.

"On the Stability of Rotating Gaseous Spheres," Dokl. AN SSSR, 46,
No.2, 1945.

State Astronomical Inst. im. Shternberg

SEVERNY, A. B.

Severny, A. B. On the stability of gaseous stars. Astr. J. Soviet Union [Astr. Zhurnal] 23, 137-140 (1946). (Russian. English summary)

Purely radial oscillations are considered for a star in radiative equilibrium throughout. The equation of oscillation is considered as an eigen-value equation and inequalities are obtained for the lowest period. Two crude sufficient conditions of stability for radial displacements are derived: one states that the ratio of specific heats must exceed $16G\rho_m^2 a^2 / (3\pi\bar{p})$ (ρ_m the maximum density, a the radius, \bar{p} a mean pressure); the other, involving the ratio of gas pressure to total pressure, is satisfied whenever there is stability against convection.

T. G. Cowling (Bangor).

Am. J. Astronomical Reviews.

Vol.

No. 3

| 1ST AND 2ND ORDERS | | | | | | | | | | | | | | | | | | | | | | | | | | 3RD AND 4TH ORDERS | | | | | | | | | | | | | | | | | | | | | | | | | |
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| PROCESSES AND PROPERTIES INDEX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div style="position: relative; height: 400px;"> <div style="position: absolute; top: 10%; left: 10%; font-size: 4em; transform: rotate(-45deg);">CA</div> <div style="position: absolute; top: 15%; right: 15%; font-size: 2em;">3</div> <div style="position: absolute; top: 20%; left: 30%;"> <p>The structure of the giant stars. A. B. Severnyi and N. G. Masevich (Astronom. Sternberg-Inst., Moscow). <i>Astron. Zhur.</i> 23, 221-4(1946); <i>Chem. Zhur.</i> 1947, 1, 293. —Previously, the source of energy and the structure of the giant stars have been explained on the basis of nuclear reactions. On the basis of calcns. of the temp. and life of these stars, it is shown that such an explanation will not withstand crit. examn. and that the problem of the source of the energy of the giant stars is by no means to be regarded as solved. M. G. Moore</p> </div> </div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div style="display: flex; justify-content: space-between;"> <div> <p>ASB-SEA</p> <p>RETILOGICAL LITERATURE CLASSIFICATION</p> </div> <div> <p>RECHN. GOMINY</p> <p>RECHN. GOMINY</p> </div> </div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

2925. Non-static stellar atmosphere. **SYNOPSIS.**
A. B. *Astron. J., USSR, 34 (No. 6) 344 (1947) In Russian.* English summary in *Astron. News Letter (Harvard) (No. 38)*.—In the equations of continuity, of motion and of energy the velocity is decomposed into "mean" velocity and "turbulent" velocity, and the equations are rewritten assuming (a) no source of energy in the stellar envelope, (b) no viscous friction, (c) isotropic distribution of turbulence. The equations reduce to well known forms for static models; an analysis of the general case of variation of absorption coeff. with temp. is given. Application to stars with $v_{\text{turb}} \gg v_{\text{mean}}$ leads to conclusion that turbulence is a negligible factor in heat transfer, but makes an important contribution to the pressure. An expression for the radial function of turbulent velocity is attempted. The results are applied to Cepheids, Wolf-Rayet and other stars. M. W. O.

523.835

2913. On the origin of extragalactic nebulae.
SEVERNY, A. B. AND ZIL'MANOV, A. L. Astron. J.
USSR, 24 (No. 6) 372 (1947) In Russian. English
summary in Astron. News Letter (Harvard) (No. 38).
The results of a paper by Gamow and Teller on the
age of extragalactic nebulae from their expansion
characteristics [Abert, 1970 (1939)] are challenged on
the grounds of false assumption and internal
inconsistency. M. W. O.

ASAC-SEA METALLURGICAL LITERATURE CLASSIFICATION

SEVERNY, A. B.

Severny, A. B.

Turbulent State of The Solar Chromosphere

Doklady Akademiy Nauk, SSSR
Vol. 58, 1947, pp. 1617

From: B. N. L. Guide to R-Scientific Per-Lit. No. 2, Vol. 1, May 1948, p. 4

| PROCESS AND PROPERTIES INDEX | | 152 | |
|--|--|---|--|
| 523.877 | 7715. On the stability and oscillations of gaseous spheres and stars. A. B. SEVERNY. <i>Contr. Crimean Astrophys. Obs.</i> , 1 (P72)(1948) In Russian. | | |
| <p>The stability was studied by the theory of small oscillations. The stability depends on 3 factors: the chemical composition (which determines $\gamma = c_p/c_v$); the process of generation of energy; and the mode of dissipating the energy. The first of these produces instability when $\gamma < 4/3$; if $\gamma > 4/3$, the star is stable and is able to pulsate harmonically. Dissipating forces (such as turbulence and radiative viscosity) tend to stabilize the star; when $\gamma > 4/3$ pulsations are damped and when $\gamma < 4/3$, these forces retard the instability. This is conditioned by the mean density of the star which, in turn, is a function of its mass. The dissipation of energy in stars of moderate mass is much larger than the excess of heat produced by the nuclear reactions, but in the very massive stars where β tends to 0, any mode of generating energy creates instability.</p> <p>Stars of very small mass turn out to be always stable. As the mass grows larger, 2 classes with the same effective temperature can be distinguished: diffuse, large stars ($\gamma < 4/3$, $\rho_m < \rho$ critical) and dense small</p> | | <p>stars ($\gamma > 4/3$). In between, there is the area of instability which gradually disappears with further growth of mass and temperature. In the process of transition over this area and during condensation or expansion of the star, it collapses. White dwarfs form the most advantageous configurations. When masses are very large, however, we enter again into an area of instability caused by the source of energy. The diagram can possibly explain the basic facts of the Hertzsprung-Russell diagram as well as the upper limit of masses. A low frequency of giants of late classes in our galaxy and the fast evolution of these stars suggest that the ideas of temporary stability of these stars may be correct.</p> <p>A law connecting the period of free pulsation with the density in Emden spheres has been derived. Computations show better agreement with observations than similar computations of Eddington and of Ledoux and Pekeris. The turbulent damping of pulsations is roughly inversely proportional to the mean density; consequently stars with short periods have, statistically speaking, smaller amplitudes. It is likely that in stars with permanent pulsations the concentration of the sources of energy toward the centre is very high (formula of Atkinson). It has been found analytically that slow rotation of a star makes it unstable with respect to non-radial pulsations. This may lead to the formation of a double star.</p> | |
| ASTRONOMICAL NEWS LETTER | | | |
| METALLURGICAL LITERATURE CLASSIFICATION | | | |
| ASTRONOMICAL NEWS LETTER | | | |

SEVERNYY, A. B.

Severnny, A.B. "Internal structure of stars" in symposium:
Astronomiya v SSSR zatridtsat' let, Moscow-Leningrad, 1948,
p. 179-83

SO: U-2888, Letopis Zhurnal'nykh Statey, No. 1, 1949

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| 1ST AND 2ND GROUPS | | | | | | | | | | | | | 100 AND 6TH CODES | | | | | | | | | | | | |
| SA | | | | | | | | | | | | | A 32 | | | | | | | | | | | | |
| 7454. An interference filter for the study of the sun and its application | | | | | | | | | | | | | 522.56 : 535.511 | | | | | | | | | | | | |
| A. B. Seyarny and A. B. Gilvarg. Izv. Crimean Astrophys. Obs., 4 (No.3) | | | | | | | | | | | | | | | | | | | | | | | | | |
| (1949). English Abstr. in Astron. News Lett. (Harvard) (No. 56) (June 20, | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1951) In Russian. | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Following the work of Lyot, Roberts, Waldmeier, Pettit and Evans, the authors have built an interference-polarization filter of Russian quartz. The optical theory, the max practical problem of cutting the quartz and preparing the necessary pieces of polaroid film, the optical tests and the results of observations of prominences are described. The effective width of the filter is 1.8 Å. Experiments have also been conducted by crossing the filter with a Fabry etalon. In this manner the background of the sky becomes almost completely black.</p> | | | | | | | | | | | | | | | | | | | | | | | | | |
| Astronomical News Letter | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION</p> <p>1000 1000</p> | | | | | | | | | | | | | | | | | | | | | | | | | |

SEVERNYI, A. B.

USSR/Physics - Astrophysics
Filters, Light

Sep 49

"An Interference-Polarization Light Filter for Astrophysical Purposes," A. B. Gil'varg, A. B. Severnyy, Inst of Cryst, Acad Sci USSR, Crimean Astrophys Obs, Acad Sci USSR, 4 pp

"Zhur Tekh Fiz" Vol XIX, No 9

Filter was designed and constructed so that one of the passbands was centered on the red hydrogen line H_{α} , $\lambda \approx 6,562.8$ A at a temperature of 36°C ; this passband was about 2 A wide for this line. Filter consisted of eight quartz plates with polaroids between them and along the edges of the block. Wave lengths of all passbands for a temperature of 36°C and normal incidence of the rays are 7,346, 6,563, 5,960, 5,470, 5,065, 4,719, 4,431, 4,186, 3,990 A. By changing temperature of a thermostat in which filter was contained it was possible to center one of the passbands in the blue part of the spectrum on the polarized calcium line in the sun's spectrum H or K (3,969 and 3,934 A). Over-all length of filter is about 17 cm. Submitted 10 Aug 48

PA 149T80

SEVERNYY, A. B. (Edited by), CHANDRESEKAR, S. and TSESEVICH, V. P.

"Introduction to the Study of the Structure of Stars", Publishers of Foreign Literature, Moscow, 467 pp, 1950.

A

PROCESSES AND PROPERTIES INDEX

A 52.

B660. Spectrophotometry of chromospheric eruptions. E. R. MURTEL AMEL A. B. BEVERID. Ann. Crimian Astrophys. Obs., 8 (1930); English Abstr. in Astron. News Lett. [Harvard] No. 56, 8-9 (June 20, 1951) In Russian.

The investigation is based on 12 standardized spectragrams of chromospheric eruptions. The characteristics of the contours of the Balmer series and the H and K lines are discussed; no asymmetry is found; a delay in the lifting of the wings of the H and K lines is interpreted as a result of ionization of Ca II in the reversing layer by the flare radiation, determined by the lines L β , Ly, etc., and radiation beyond the Lyman limit, the delay being due to the slow diffusion of high-frequency quanta from great optical depths. A similar effect for the hydrogen lines finds an analogous explanation. The height of the eruption is computed from the intensities of dark cores to the H and K lines. The observed contours have been carefully corrected for diffused light and instrumental distortion.

M. W. OVENDEN

ASH SLE METALLURGICAL LITERATURE CLASSIFICATION

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| 1ST AND 2ND ORDERS | | | | | | | | | | 3RD AND 4TH ORDERS | | | | | | | | | |
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| SA | | | | | | | | | | A 62 | | | | | | | | | |
| 523.75 | | | | | | | | | | | | | | | | | | | |
| <p>812. Investigation of fluctuations in the luminescence of solar prominences. A. B. Geyernyi. Dokl. Akad. Nauk, SSSR, 73 (No. 3) 475-8 (1980) In Russian. Experimental measurements are described made with a specially-constructed narrow-band polarizing interferometer and coronagraph to determine the time relationship of the relative brightness of luminescence of solar prominences and the similar relationship of the fading time to the dimension l of characteristic nodes moving nearly perpendicularly to the visual ray. The results appear to indicate in particular that the luminescence of the prominences is caused by heating from the corona. The origin of the phenomenon, however, still requires detailed investigation, although the impression is already obtained that the process is one of adiabatic expansion and hypercooling of H projected from the interior of the body into the incandescent plasma of the solar corona. L. J. Goodlet</p> | | | | | | | | | | | | | | | | | | | |
| <p>ASAC-5LA METALLURGICAL LITERATURE CLASSIFICATION</p> <p>2001 200100</p> <p>201121 GME GME 101</p> | | | | | | | | | | | | | | | | | | | |

SEVERNYY, A. B.

USSR (600)

Spectrum, Solar

Spectrophotometry of Fraunhofer lines with the aid of the Spectrograph and Fabry's calibrator. Izv.Krym.astrofiz. obs., no. 7, 1951.

Monthly List of Russian Accessions, Library of Congress, November 1952. UNCLASSIFIED

SEVERNY, A. B.

PA 228T102

USSR/Astronomy - Spectroheliograph

1951

"Spectroheliograph of the Crimean Astrophysical Observatory," G. A. Monin, A. B. Severnyy

"Iz Krymskoy Astrofiz Obser" Vol 7, pp 113-117

Evaluates various types of spectroheliographs. Describes the spectroheliograph constructed in the Crimean Astrophys Obs. It is located in the tower of the 40-inch reflector, has grating and prism, and was adapted to cinematography. However, article states, photographs by this equipment showed periodical errors and the parts had to be adjusted.

228T102

Severnyy, A.B.

PA 175T5

USSR/Astronomy - Astrophysics, 11 Jan 51
Spectroscopy,
Infrared

"Test of Phosphor Photographs of Solar Protuberances in Infrared," A. B. Severnyy,
Crimean Astr Obs, Acad Sci USSR, Simeiz

"Dok Ak Nauk SSSR" Vol LXXVI, No 2, pp 189-191

Photographs of protuberances were made in He line in infrared, using Lyot's filter and phosphor flash screen in contact with photoplate. Readings of intensities confirmed expectations.

175T5

| 1ST AND 2ND ORDERS | | | | | | | | | | | | | | | | | | | | | | | | | | 3RD AND 4TH ORDERS | | | | | | | | | | | | | | | | | | | | | | | | | |
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| PROCESSES AND PROPERTIES INDEX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div style="float: right; font-size: 2em; margin-right: 20px;">A 52</div> <div style="float: left; font-size: 2em; margin-left: 20px;">SA</div> <div style="clear: both;"></div> <div style="text-align: right; margin-bottom: 10px;">523.77</div> <p>5994. The experiment in the electrophotometry of the solar spectrum. V. B. NIKOMYV AND A. B. SIVIRSKII. <i>Dokl. Akad. Nauk, SSSR</i>. 77 (No. 2) 217-20 (1951) In Russian.</p> <p>Describes a simple recording solar electrophotometer designed so as to work in conjunction with the diffraction spectroheliograph of the Crimean astrophysical observatory. The apparatus was used for (1) the investigation of the "centre-edge" effect in the contours of the strong <i>H</i> and <i>K</i> lines of ionized Ca; (2) the determination of the contours of <i>H</i> and <i>K</i> lines both in the centre of the sun and at a distance 1/40 from the edge near the pole; and (3) as a photoelectric spectroheliograph.</p> <p style="text-align: right;">P. LACHMAN</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div style="display: flex; justify-content: space-between;"> <div> <p>ASH-15A METALLURGICAL LITERATURE CLASSIFICATION</p> <p>SECTION SYMBOLS</p> <p>GROUPS</p> </div> <div> <p>SECTION HELP ONLY ONE</p> <p>SECTION ONE ONLY ONE</p> </div> </div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

USSR/Astronomy - Solar Flares

21 Oct 51

"Investigating the Spectra of Large Chromospheric Flares on the Sun," E. R. Mustel', A. B. Severnyi, Crimean Astrophys Obs of Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXX, No 6, pp 867-870

Discusses the chromospheric flare of 5 Aug 49, which was one of the brightest observed up to that time (ball +3) and which occurred over a group of sunspots about 1100 Moscow time, attaining its max brightness about 1110 and thereafter slowly diminishing. From the moment of max brightness up

217157

to 1150 a total of 17 spectrograms were taken on the Simeiz Observatory's spectrohelioscope-spectroscope, giving the spectra near the line H (150 Å) and in the region of H and K lines (from 4,500 to 3,750 Å). Submitted 28 Aug 51 by Acad G. A. Shayn.

SEVERNYI, A. B.

217157

SEVERNYY, A.B.

PHASE I

TREASURE ISLAND BIBLIOGRAPHIC REPORT

AID 121 - I

Call No.: AF539690

BOOK

Authors: AMBARTSUMYAN, V.A., MUSTEL', E.R., SEVERNYY, A.B., SOBOLEV, V.V.

Full Title: THEORETICAL ASTROPHICS

Transliterated Title: Teoreticheskaya astrofizika

Publishing Data

Originating Agency: None

Publishing House: State Publishing House of Technical-Theoretical Literature

Date: 1952

No. pp.: 635

No. of copies: 5,000

Editorial Staff

Editor: None

Tech. Ed.: None

Editor-in-Chief: None

Appraiser: None

Others: Pikel'ner, S.B. wrote two paragraphs.

Text Data

Coverage: A textbook on astrophysics, mainly related to the study of the sun as a star. Covers radioactive equilibrium of the stellar photospheres, spectra of the stars and the sun, the physics of the solar atmosphere, nebulae, new stars (novae), interior structure of the stars and interstellar matter.

Comments: Primarily a textbook, based on numerous sources (1927-1951). Does not compare with the more clearly written American texts (such as L.H. Aller's Astrophysics, 1953).

SEVERNYY, A.B.

Teoreticheskaya astrofizika

AID 121 - I

Purpose: Approved as a textbook in state universities by the Ministry of Higher Education, U.S.S.R.

No. of Russian and Slavic References: 66, with many footnote references.

Available: AID, Library of Congress

2/2

SEVERNYY, A. B.

USSR/Astronomy - Solar Prominences

1 Jan 52

"The Basic Types of Motions in Solar Prominences,"
A. B. Severnyy, Crimean Astrophys Obs of Acad Sci
USSR

"Dok Ak Nauk SSSR" Vol 82, No 1, pp 25-28

Gives diagrams and photographs illustrating sub-
ject types. Extends the classification of
E. Pettit (Astr J 98, 309, 1943) of 18 types.
Submitted by Acad I. A. Shayn 5 Nov 51.

230T52

RUSTAL', . . . , SA RUSTAL', A. . .

Spectrum, Solar

Investigating the spectra of a large chromosphere flare on the sun, August 5, 1949.
Izv. kryn. astrofiz. obser. No. 6, 1952.

Monthly List of Russian Accessions, Library of Congress
June 1953. WCL.

Shchegolev, A. D.

Solar radiation

Total energy emitted by chromosphere flares. Izv. Krym. astrofiz. obser. No. 9, 1952.

Monthly List of Russian Accessions, Library of Congress
June 1953. UNCL.

SEVERNY, A. B.

USSR/Astronomy - Sun, Chromosphere Dec 52

"The Chromosphere and Chromospheric Flares on the Sun," S. V. Pikel'ner

Priroda, No 12, pp 25-35

Discusses the work of A. B. Severny, E. R. Mustel', and G. A. Monin with the spectroheliograph at the Crimean Astrophys Observatory. Compares the various solar-flare theories of E. R. Mustel' (that solar flares are formed by the falling of a large quantity of ionized coronal matter into the chromosphere) and of A. B. Severny (that flares result from huge fields in the sun) with Giovanelli's (that flares represent

263T83

electric charges in the chromosphere formed under the action of an electric field induced by developing sunspots). States that further work is necessary to decide among the various competing theories on the chromosphere.

263T83

SEVERNYY, A.B.

USSR/Astronomy - Observatories

Mar 53

"Studies of the Sun", A. B. Severnyy

Nauka i Zhizn, No 3, pp 30-32

Describes solar telescopes and their applications. Pulkovo Observatory has a horizontal solar telescope 17 meters long, of Ponomarev design. A modern, vertical solar telescope is under construction in the Crimean Astrophys Observ, Acad Sci USSR. Here A. B. Gilvart and the writer manufactured the first Russian polarizing filters, used for observation and photography. The altitude station of the Main Astronomical Observatory of the Caucasus was equipped with the first coronagraph of Russian design.

271T70

SEVERNYY, A.B. and KHOKHLOVA, V.I.

The Sun, Photosphere; Chromosphere (1773)

Izv. Krymskoy astrofiz. observ, Vol 10, 1953, pp 9-53

Severnny, A.B. and Khokhlova, V.I.

"An Investigation of the Motion and Brightness of Solar Prominences"

Describes the study made from 1948 to 1951 at the Crimea observatory of solar prominences. Much of the data was recorded on film. Detailed lists of speeds and magnitudes are included.

SO: Referativny Zhurnal—Astronomiya i Geodeziya, No 1, Jan 54;
(W-30785, 28 July 1954)

SEVERNY, A. B.

11 Aug 53

USSR/Astronomy - Sun, Prominences

"Magneto-Hydrodynamic Motions in Solar Prominences," A. E. Severnyy, Crimean Astrophys
Observ, Acad Sci USSR

DAN SSSR, Vol 91, No 5, pp 1051-1054

Derives from basic eqs of magnetic hydrodynamics the eqs of perturbation of a magnetic
field. Discusses solution in the form of a plane wave. Presented by Acad G. A. Shayn
12 Jun 53

266T62

SEVERNYY, A. B.

USSR/Astronomy - Cinematography

Card 1/1 : Pub. 124 - 13/38

Authors : Severnny, A. B., Professor

Title : Motion picture filming during astronomical investigations

Periodical : Vest. AN SSSR 8, 78-80, Aug 1954

Abstract : Review is presented of various astronomical and astrophysical institutions in the USSR and abroad which, since 1938, adapted the use of motion picture to their scientific investigations. The value of motion picture recording of astronomical and astrophysical phenomena and especially the recording of spectra of such rapidly changing formations on the sun as conflagrations, and protuberances, is discussed.

Institution :

Submitted :

80798

3,1530
24.2/20

SOV/124-59-9-9774

Translation from: Referativnyy zhurnal, Mekhanika, 1959, Nr 9, p 26 (USSR)

AUTHOR: Severnyy, A.B.

TITLE: On the Magnetic-Hydrodynamic Phenomena Near the Surface of the Sun ✓

PERIODICAL: Izv. Krymsk. astrofiz. observ., 1954, Vol 11, pp 129 - 151

ABSTRACT: The study of the motions in solar prominences, which was carried out in the author's previous works, showed that their characteristic properties can not be explained merely by the action of the gravitation forces, the gas and radiation pressures. Such specific features as the approximately uniform motion of streams and nodes along curved trajectories near the surface of the sun, the reversal of direct motion along the same trajectory, the preferential direction of motions over the Sun surface, show that electromagnetic forces play an important part in all processes mentioned. The author raises the problem to explain the motion of great masses of the macroscopically neutral plasma along the lines of force of a magnetic field on the basis of the equations of magnetic hydro-

Card 1/6

80798

SOV/124-59-9-9774

On the Magnetic-Hydrodynamic Phenomena Near the Surface of the Sun

dynamics. The basic difficulty of the problem consists in the fact that the component of the Ampere active force along the lines of force of the magnetic field is equal to zero. The author presumes that the initial motions of the gas masses in prominences are caused by local drops in pressure, and cites data from observations in favour for this assumption. The field of hydrodynamical quantities and the field of electromagnetic quantities are considered, in contrast to the previous studies, to be interconnected and determined simultaneously for certain initial and boundary conditions. The plasma compressibility is taken into account. Moreover, the conductivity of the gas is presumed to be infinite great, and it is proved later on that the allowance for finite conductivity does not alter considerably the results obtained. The investigation is limited to the case of small motions near the state of hydrostatic equilibrium within an external magnetic field H_0 . Assuming $H = H_0 + H'$, wherein H is the field induced by a weak excitation, the author obtains the full system of equations of the magnetic hydrodynamics of compressible plasma for small motions in the following form (it is assumed that the plasma motion proceeds adiabatically, i.e., $p = p(T)$):

Card 2/6

✓

80798

SOV/124-59-9-9774

On the Magnetic-Hydrodynamic Phenomena Near the Surface of the Sun

$$\frac{\partial \sigma}{\partial t} = \text{div } v; \quad c_o^2 = \Gamma p_o / \rho_o, \quad \rho' = \rho_o \sigma, \quad p = c_o^2 \rho_o \sigma.$$

The quantities having the index zero pertain to the initial state, with the index prime to small variations of the same quantities in consequence of excitation. The author transforms the system presented above into a system of four equations of second order and looks for its solution in the form

$$\exp (\omega t + \alpha x + \beta y + \gamma z).$$

For the determination of the fundamental frequency ω , the equation of the eighth order is obtained:

$$\omega^2 (\omega^2 - h^2 \gamma^2) \{ \omega^4 + \omega^2 [g - b (h^2 + c_o^2) - b h^2 (\gamma^2 c_o^2 - \gamma g_{oz})] \} = 0$$

$$h^2 = \frac{H_o^2}{4\pi \rho_o}; \quad g = \alpha g_{ox} + \beta g_{oy} + \gamma g_{oz}, \quad b = \alpha^2 + \gamma^2 + \dots$$

The second factor presents the Alfven solution, the third factor determines the "fundamental frequencies" for small motions. If $\omega^2 < 0$, the equilibrium

Card 4/6

80798

SOV/124-59-9-9774

On the Magnetic-Hydrodynamic Phenomena Near the Surface of the Sun
under the condition that the angle between H_0 and g is small. The estimation of the velocities and accelerations by means of the formulae obtained shows that they are near the velocities and accelerations observed within the prominences ($v \approx 100$ km/sec, $\dot{v} = 10^4$ cm/sec²). The magnitude of the relative pressure drop necessary for such velocities and accelerations, must be about $\sim 1/30$. The author discusses in conclusion wave motions and their attenuation by gravity. He shows that magneto-hydrodynamic waves propagate without attenuation only over the sun's surface. The rate of attenuation is the greater the smaller the angle between H_0 and g . The attenuation time is measured by hours for intense fields and by minutes for weak fields.

A.A. Nikitin

X

Card 6/6

"Study of Development of Chromospheric Flares on the Sun," Izv. Kryash. Astrofiz. Observ. 12, 1954, p. 3-14

Flare observations were carried out by means of a coronagraph and interference-polarization filters. Motion-picture recording showed that flares accompany either the development or the decay of spot groups. A ratio of the flare area to its duration could be established. The characteristic motion of flares was studied. (IZhAstr, No 6, 1955) SC: Sum.No.713, 9 Nov 55

Severnyy, A.B.
SEVERNYI, A.B., doktor fiz.-matem.nauk; SHAPOSHNIKOVA, Ye.F.

Investigating the development of chromospheric flares on the
sun. Izv.Krym.astrofiz.obser. 12:3-32 '54. (MIRA 13:4)
(Sun)

SEVERNTY, A.B., doktor fiz.-matem.nauk

Investigating physical conditions in solar prominences by
means of emission lines with self-absorption. Izv.Krym.astrofiz.
obser. 12:33-45 '54. (MIRA 13:4)
(Sun--Prominences)

SEVERNYY, A.B.; MUSTEL', E.R.

Investigating the chromospheric flare of June 13, 1950. Izv.
Krym.astrofiz.obser. 13:82-95 '55. (MIRA 13:4)
(Sun)

SEVERNYY, A.B.

Flare above the sun's limb of August 16, 1952, and the problem
of transparency and radiation of chromospheric flares. Izv.
Krym.astrofiz.obser. 13:103-110 '55. (MIRA 13:4)
(Sun)

SEVERNYY, A.B.

Tower solar telescope of the Crimean Astrophysical Observatory
of the Academy of Sciences of the U.S.S.R. Izv. Krym. astrofiz.
obser. 15:31-53 '55. (MIRA 13:4)
(Telescope)

SEVERNYY, A.B.

Comparing separate phenomena in the radio wave emission of
the sun on the wavelength $\lambda = 1.5\text{m}$. with optical processes
on the sun. Izv.Krym.astrofiz.obser. 15:111-120 '55.
(MIRA 13:4)

(Sun) (Radio astronomy)

USER/ Physics - Astrophysics

Card 1/1 Pub. 43 - 9/97

Authors : Severnyy, A. G., and Mustel', E. R.

Title : Study of spectra of chromospheric flashes on the sun

Periodical : Izv. AN SSSR. Ser. fiz. 18/2, page 249, Mar-Apr 1954

Abstract : Brief report is presented on the analysis of spectra of chromospheric flashes observed on the sun. The analyzed spectra, photographed by means of a spectrohelioscope, pertain to a larger chromospheric fulmination observed on August 5, 1949 which was followed by a 10-minute break in short-wave radio reception and sharp increase in radio-radiation of the sun.

Institution : Academy of Sciences USSR, The Crimean Astrophysics Observatory

Submitted :

SEVERNY, A. B.

AID - P-228

Subject : USSR/Astronomy
Card : 1/1
Authors : Severnyy, A. B. and Shaposhnikova, Ye. F.
Title : On the Development of Flares in the Sun's Chromosphere
Periodical : Astron. zhur., v. 31, 2, 124-130, Mr - Ap 1954
Abstract : All chromosphere flares can be grouped in two classes:
1) flares in which the matter is observed to be in motion
in the form of streams or ejections, and 2) "static"
flares without such motion, and the development of which
is followed by uniform expansion and contraction. It is
found that all the flares expand after ignition and con-
tract when going out, and that the maximum flare bright-
ness depends on the velocity of expansion of the flare.
A correlation of the life period of a flare with its
area has been ascertained. A possible physical mechanism
explaining these regularities is suggested. Three sets
of photoplates, five graphs and a table. 10 references,
1 after 1948, of which 7 are Russian.
Institution : Crimean Astrophysical Observatory of the Academy of
Sciences, USSR.
Submitted : December 1, 1953

SEVERNIY, A.B.

AID P - 430

Subject : USSR/Astronomy
Card 1/1 Pub. 8, 9/16
Author : Severniy, A. B.
Title : Structure and Chemical Composition of Stars of Main Sequence
Periodical : Astron. zhur., v. 31-4, 362-371, J1-Ag 1954
Abstract : Two conditions are determined under which the thermo-nuclear reaction with a carbon ring can maintain the radiation of gaseous stars. It is shown that: 1) the carbon ring can maintain the radiation of stars of main sequence and 2) the molecular weight and content of helium increases and that of hydrogen decreases in passing from the massive stars to the dwarfs. Formulae, tables and graphs. 16 references.
Institution : Crimean Astrophysical Observatory, Acad. of Sci., USSR
Submitted : March 11, 1954

SEVERNYY, A. B.

USSR/Astronomy - Solar spectrum

Card : 1/1 Pub. 22 - 9/48

Authors : Severnyy, A. B.

Title : Spectroscopic proof of the presence of deuterium on the sun

Periodical : Dok. AN SSSR 97/5, 789 - 792, August 11, 1954

Abstract : A method and the results of thorough photo-electric investigations of the hydrogen line $H\alpha$ (λ 6562.8) in the sun spectrum are described. Six references (1940-1952). Diagram; graphs.

Institution : Crimean Astro-Physical Astronomical Observatory of the Acad. of Scs. of the USSR

Presented by : Academician G. A. Shayn, May 17, 1954

"Deuterium on the Sun"

Astron. Tsirkulyar, No 100, 1964, pp 7-8

Studies of H_{α} and H_{β} lines revealed an outspoken asymmetry produced by the blending of these lines with faint deuterium lines (lines 6561.03 and 4860.03). The equivalent breadth of depression on the blue wing of H_{α} line around 100 m μ points to a deuterium content exceeding several times that on Earth. (RZhAstr, No 2, 1955)

SC; Sum. 492, 12 May 55

DOBRONRAVIN, P.P.; SEVERNYI, A.B., professor, redaktor; GUROV, K.P.
redaktor; MOSKVICHEVA, N.I., tekhnicheskii redaktor.

[Crimean astrophysical observatory of the Academy of Sciences
of the U.S.S.R.] Krymskaia astrofizicheskaiia observatoriia
Akademii nauk SSSR. Moskva, izd-vo Akademii nauk SSSR 1955. 86 p.
(Simeiz--Observatories)

BRODSKAYA, E.S.; SEVERNYI, A.B., doktor fiz.-mat.nauk, otv.red.;
SHAYN, G.A., akademik, red.; MUSTEL', E.R., red.; DOBRONRAVIN,
P.P., kand.fiz.-mat.nauk, red.; GUROV, K.P., red.izd-va;
POLYAKOVA, T.V., tekhn.red.

[Catalog of spectral classes, magnitudes, and color indices
of 5752 stars in the area of the Milky Way with the center ..

$\alpha = 23^{\text{h}} 25^{\text{m}}$, $\delta = 61^{\circ} 30'$] Katalog spektral'nykh klassov,
velichin i pokazatelei tsveta 5752 zvezd v ploshchadke
Mlechnogo Puti s tsentrom $\alpha = 23^{\text{h}} 25^{\text{m}}$, $\delta = 61^{\circ} 30'$. Moskva,
Izd-vo Akad.nauk SSSR, 1955. 137 p. (Akademiia nauk SSSR.
Krymskaia astrofizicheskaia observatoriia. Izvestiia, v.14).
(MIRA 12:11)

1. Chlen-korrespondent AN SSSR (for Mustel')
(Stars--Catalogs)

SEVERNYI, A.B., (Dir. Crim. Astrophysics Observ.)

"Results of his observations testifying to the commonness of physical phenomena originating in the active areas of the Sun and in nonstationary stars", a paper presented at the Conference on Nonstationary stars held at the Byurakan Astrophysics Observatory of the Academy of Sciences Armenian SSR from September 20-23 1956.

Sum. 1287

SEVERNYY, A.B., professor.

At the Crimean Astrophysical Observatory; expanded observation
program. Vest.AN SSSR 26 no.8:88-90 Ag '56. (MIRA 9:9)
(Crimean Astrophysical Observatory)

W
re
SEVERNYY, Andrey Borisovich; FESENKOV, V.G., akademik, otvetstvennyy
redaktor; YEFREMOV, Yu.I., redaktor izdatel'stva; KASHINA, P.S.,
tekhnicheskiiy redaktor

[Solar physics] Fizika solntsa. Moskva, Izd-vo Akademii nauk
SSSR, 1956. 158 p. (MLRA 10:2)
(Sun)

Category : USSR/Radiophysics - Application of radiophysical methods

I-12

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1986

Author : Severnyy, A.B.

Title : On the Comparison of Individual Events in Radiowave Radiations from the Sun at 1.5 meters with Optical Phenomena on the Sun

Orig Pub : Tr. 5-go soveshchaniya po vopr. kosmogonii. 1955, M., AN SSSR, 1956, 224-227, diskus. 227-228

Abstract : See Ref. Zhur. Fiz. 1956, 14394

Card : 1/1

SEVERNYY, A.B.; STEPANOV, V.Ye.

First observations of magnetic fields of sunspots at the
Crimena Astrophysical Observatory. Izv.Krym.astrofiz.obser.
16:3-11 '56. (MIRA 13:4)
(Sunspots) (Magnetic fields)

SEVERNYY, A.B.

Investigating deuterium in the sun. Izv.Kryn.astrofiz.obser.
16:12-44 '56. (MIRA 13:4)
(Spectrum, Solar) (Deuterium)

SEVERNYY, A.B.

Broadening of hydrogen lines in the solar spectrum. Izv.Krym.
astrofiz.obser. 16:54-66 '56. (MIRA 13:4)
(Spectrum, Solar)

SEVERNY, A.B.

Some problems in studying the sun. Izv.Krym.astrofiz.obser. 16:
194-196 '56. (MIRA 13:4)
(Sun)

SEVERNYY, A.B.

✓ Fine structure in solar spectra. A. B. Severnyy (Astron. phys. Observatory, Pechino, Crimea, U.S.S.R.). *Observatory* 76, 241-2 (1956). C.A. 51, 6351r. With high dispersion and resolving power the dark lines in the solar spectrum show fine structure consisting of fine threads and thin, brilliant wings in emission. The shortward wing is usually brighter than the longward wing. These features are attributed to unstable gaseous formations that are raised to the surface of the sun. On decay they liberate continuous emission in units comparable with the thermonuclear generation of energy in the sun's interior, eject radiating particles with high velocity, and collisionally excite and ionize atoms.

C. Kress

SOV/169-59-3-2999

Translation from: Referativnyy zhurnal, Geofizika, 1959, Nr 3, p 139 (USSR)

AUTHOR: Severn^y, A.B.

TITLE: Spectroscopic Investigations of the ¹²Sun's Corpuscular Emissions

PERIODICAL: V sb.: Fiz. solnechn. korpuskulyarn. potokov i ikh vozdeystviye
na verkhnyuyu atmosferu Zemli, Moscow, AS USSR, 1957, pp 40 - 50,
Discuss., pp 50, 76 - 86 ✓

ABSTRACT: The article has not been abstracted.

Card 1/1

SEVERNY A.B.
NIKULIN, N.S.; SEVERNY, A.B.; STEPANOV, V.Ye.

Measuring weak magnetic fields and radial velocity on the solar
surface..Astron. tsir. no.183:9-13 J1 '57. (MIRA 11:3)

1. Krymskaya astrofizicheskaya observatoriya.
(Photoelectric measurements) (Magnetic fields) (Sun)

SEVERNYI, A.B.

33-3-4/32

AUTHOR: Severnyy, A.B.

TITLE: A spectroscopic investigation of the deuterium D_α line in active regions of the sun. (Spektroskopicheskoye issledovaniye linii deyteriya D_α v aktivnykh obrazovaniyakh na solntse)

PERIODICAL: "Astronomicheskiy Zhurnal" (Journal of Astronomy), 1957, Vol. 34, No. 3, pp. 328-335 (U.S.S.R.)

ABSTRACT: In a recent paper (1), the author reported evidence of the existence of a weak line of the heavy isotope of hydrogen D_α in the spectrum of the sun. The existence of this line is shown by a small change in the intensity and profile of the line $\lambda 6561.105 \text{ \AA}$ between the east and west limbs of the solar disc. Measurements of this effect have led to the equivalent width of the possible line $D_\alpha \approx 1.5 \text{ m\AA}$ and the relative deuterium content $D/H \approx (3 \text{ to } 5) \times 10^{-5}$ for an undisturbed solar atmosphere.

In a study of the recently discovered (2) short-lived continuous and line emission ("moustaches") near the H_α line, the author has noticed that the line $\lambda 6561.105$ in the bands of this new emission differs markedly from its continuation in the undisturbed atmosphere (3). In the spectra of spots, this

Card 1/3

SEVERNY, A. B.

AUTHOR: Severnyy, A. B.

33-5-2/12

TITLE: Some Results of Investigations of Non-stationary Processes on the Sun. (Nekotoryye Rezul'taty Issledovaniy Nestatsionarnykh Protsessov Na Solntse.)

PERIODICAL: Astronomicheskii Zhurnal, 1957, Vol.34, No.5, pp. 684-693 (USSR).

ABSTRACT: In the present paper the author reports results of investigations of non-stationary processes on the Sun carried out during the last 4 years. In Ref. 1 the author has shown that the emission from active areas has a well defined fine structure which shows up if one uses a high spectral resolving power (400 - 600 thousands), a high dispersion (4 - 5 mm per Å) and very high quality images. In the region of flares, developing groups of spots and faculae, the emission is concentrated in short-lived ($1^m.5 - 30^m$) "nuclei" whose dimensions are of the order of a few hundreds of kilometers. Particularly surprising and interesting is the appearance of very thin (about 0".5) luminous wings ("moustaches") on both sides or one side only of a line. These extend to up to 10 - 15 Å from the centre of a line. Examples of these

Card 1/4 phenomena are shown in figures 1 and 2. Recent studies

33-5-2/12

Some Results of Investigations of Non-stationary Processes on the Sun.

(Ref.2) have lead to the following results.

Continuous nonstationary emission originates in optically thin grains (size $0''.5 - 3''$, lifetime up to 30^m) at the different levels of solar atmosphere ($0 \leq \tau \leq 0.6$). This fact as well as the intensity-distribution in the spectrum and the polarization of this emission indicate that the emission is of nonthermal origin. This emission cannot be caused by recombination processes or by scattering on possible electronic condensations. Possibly it can be produced by relativistic electrons with the differential energy spectrum $dN(E)$ and E/E . Nonstationary line-emission (moustaches) originates in very small ($\sim 0''.5$) shortliving ($1^m - 20^m$) grains at different depths ($0 \leq \tau \leq 0.4$).

Spectroscopic investigations showed that these moustaches are explosion - or outburst-like phenomena. The atoms are ejected out of a small grain in two opposite directions along the magnetic lines of force with velocities up to 1000-2000 km/sec. The wings in great flares (importance > 2) are composed of a cluster of moustaches of different widths. The spectroscopic examination of the Hydrogen spectrum of flares showed that the population is nearly

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33-5-2/12

Some Results of Investigations of Non-stationary Processes on the Sun.

electron gas in flares cools very rapidly (fractions of a sec.) as a result of inelastic collisions of electrons with H-atoms, the main process being collisional excitation and ionization from upper levels. There should exist a source generating the energy with the rate ~ 500 ergs/cm² sec. to counterbalance these losses during the life-time of flare. It was shown that the mechanisms of electromagnetic heating and the coexistence of coronal matter with that of the flare cannot provide the necessary amount of energy. Several experimental data are presented in favour of the importance of high energy particles in the processes considered. The D₂-line strengthening above flares and moustashes indicates that possibly neutrons are also formed in these formations. The acceleration mechanism can hardly be a statistical one, (Fermi's). There is some evidence that not only weak but also strong magnetic fields on the Sun (the one of sunspots etc.) possess a fine structure and, possibly, the fields of separate field-tubes attain several 10^4 gauss. This offers the possibility of considering some kind of cyclotron acceleration of particles. The possibility of a

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33-5-2/12

Some Results of Investigations of Non-stationary Processes on the Sun.
"reversed" pinch-effect is also mentioned. There are 3
figures, no tables and 27 references, 21 of which are Slavic.

SUBMITTED: June, 17, 1957.

ASSOCIATION: Crimean Astro-physical Observatory of the Academy of
Sciences of the USSR. (Krymskaya Astrofizicheskaya
Observatoriya Akademii Nauk SSSR.)

AVAILABLE: Library of Congress.

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SEVERNY, A. B. (Prof.)

"Joint Discussion on Solar Flares and Corpuscular Streams," paper presented at
10th General Assembly, Int'l Astronomical Union, Moscow, Aug 1958.

Director, Crimean Astrophysical Observatory (USSR)

AUTHOR: Severnyy, A. R.

33-35-3-4/27

TITLE: Instationary Processes in Solar-Flares as Expressions of the Pinch-Effect (Nestatsionarnyye protsessy v solnechnykh vapyshkakh kak proyavleniye pinch-effekta)

PERIODICAL: Astronomicheskii zhurnal, 1958, Vol 35, Nr 3, pp 335-350 (USSR)

ABSTRACT: The present paper contains a summary of observation results formerly obtained by the author and others and a theoretical discussion and evaluation of these results. The paper consists of three paragraphs: § 1. The spectra of the strong flares and moustaches § 2. The occurrence of flares in the neutral points of the magnetic field. § 3. Flares as expressions of the pinch-effect and collisions of shock waves. Hard emission of the flares.
It was found that the emission wings of Balmer lines of great flares (importance $\gg 2$) consist of a cluster of moustaches. These moustaches are one of the distinct features of the flash-phase and their asymmetry produces the apparent depression of one of the wings. It is shown that the emission of the far wings of the Balmer and H and K-lines, originating in the "core" of the flare, are broadened as a result of the Doppler effect of "macroturbulence", showing velocities from 80 to

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Instationary Processes in Solar-Flares as Expressions
of the Pinch-Effect

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250 km/sec. The central part of the emission, originating at the periphery of a flare, is broadened mainly by the Stark-effect [Ref 4,5] . Thus the spectroscopy of great flares quantitatively confirms the author's earlier conclusion [Ref 1] that peculiar emission (moustaches) is closely connected with highly non-stationary explosion-like processes commencing with a shock-wave and ejections of high-velocity atoms predominantly in two opposite directions.

Detailed photoelectric investigations made in the Astrophysical Observatory on the Crimea with the aid of a solar magnetograph [Ref 8] showed: 1) flares appear in neutral points of the magnetic field of sunspots when the gradient of field-strength is sufficiently large in the vicinity of such points, 2) the appearance of the flare leads to the destruction of the surrounding magnetic field. It is shown that the instability of the plasma sets in when the concentration of the lines of force around the neutral point is sufficiently high. The magnetic force which contracts the plasma increases more rapidly than the pressure gradient and thus plasma can contract unlimitedly (the pinch-effect in the homogeneous layer of current). The time of contraction is comparable to the observed

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of the Pinch-Effect

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time of flash-phase. At a contraction of the order of ~ 0.1 shock-waves which converge to the neutral point are developing and at further contraction (~ 0.01) the reaction of the shock-wave beyond the front stops the contraction of the plasma and makes it to expand - the phenomenon which is often observed after the onset of flares. The collision of two shock-fronts in the neutral point in the area with a characteristic dimension of $\sim 10^5$ (cm) heats impulsively the plasma up to $\sim 10^7$ K, sets in powerful macroscopic motions (the outstretching of plasma along the neutral planes) with velocities of more than 100 km/sec and leads to the diffusion and scattering of the initial magnetic field. The considered process can explain the concentration of the emission of flares and of moustaches in small grains, the appearance of high-velocity streams of atoms, the destruction of magnetic fields by flares, the expansion of flares after flash-phase and some other phenomena. The high temperature and turbulent core of such pinched plasma may be a source of neutrons (the strengthening of D_{α} in flares and moustaches [Ref 13]), x-rays (and probably γ -rays) and cosmic rays. The x-rays from flares are more probably con-

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Instationary Processes in Solar Flares as Expressions
of the Pinch-Effect

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nected with the Bremsstrahlung of streams of electrons than with the temperature radiation of the plasma. Rocket measurements of x-rays also point to such a conclusion [Ref 18]. The possibility of acceleration of particles by reflection from converging fronts of shock-waves and of ejections of plasmons is suggested.

There are 2 tables, 7 figures, and 21 references, 13 of which are Soviet, 2 English, and 6 American.

ASSOCIATION: Krymskaya astrofizicheskaya observatoriya Akademii nauk SSSR
(Crimean Astrophysical Observatory of the Academy of Sciences of the USSR)

SUBMITTED: January 20, 1958

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3(1)

AUTHOR:

Severnyy, A. B., Corresponding Member,
Academy of Sciences, USSR

SOV/20-121-5-14/50

TITLE:

On the Formation of Particles of High Energies and of
a Hard Radiation in the Outbursts on the Sun (O vozni-
knovenii chastits vysokikh energiy i zhestkogo izlucheniya
vo vspyshkakh na solntse)

PERIODICAL:

Doklady Akademii nauk SSSR, 1958, Vol 121, Nr 5,
pp 819 - 821 (USSR)

ABSTRACT:

According to kinematographic investigations, solar
outbursts are extremely non-steady processes of the
explosion type. The author mentions some experimental
facts which tend to confirm this assumption. On the
other hand, the investigation (with high resolving
power and dispersion) of the outburst spectra gives
the following results: 1) their discrete and line
emission is concentrated in very small (0,5 " -2") centers
with a short life (4^m - 20^m). 2) A special, very wide
linear emission (up to 10 - 15 Å) occurs in the phase of
the maximal growth of the strong outbursts. A non-steady
continuous emission occurs in optically thin nuclei which

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On the Formation of Particles of High Energies and
of a Hard Radiation in the Outbursts on the Sun

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are located in various depths of the solar atmosphere. Their distribution with respect to the spectrum (a noticeable increase of the intensity in the violet part) and a moderate polarization are arguments in favor of their non-thermal origin. The broadening of the emission lines can be explained by the Doppler effect which is caused by the macroscopic motions of the atom flows. The emission in the centers and in the adjacent parts of the hydrogen lines is widened by a Stark effect. The electron gas in the outbursts is cooled very fast because of the cascade ionization by electronic impact if there is no sufficiently intensive energy source ($\sim 500 \text{ erg/cm}^2 \cdot \text{sec}$). This conclusion may be confirmed by some other experimental data which are mentioned in this paper. Recent photo-electrical investigations of the solar magnetic fields (carried out by the author of this paper) gave the following results: 1) the outbursts occur in the neutral points of the magnetic field and the gradient of the field in the neighborhood of this point is noticeably high. 2) The

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On the Formation of Particles of High Energies and
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outburst causes the annihilation of the field in the neighborhood of the neutral point. Moreover, the following facts were found: 1) Strong fields (of up to 1000 Gauss) occur also outside the sun-spots. 2) The magnetic fields in the solar plasma have a non-dipole character and a very fine structure. Noticeable fields (up to 500 Gauss) extend into the chromosphere. If the field gradient near the neutral point is sufficiently high (more than 10^{-6} Gauss/cm), the plasma of the solar outburst is unstable. The collision of shock waves in a neutral plane suddenly heats the plasma up to $\sim 10^{10}$ degrees, and this causes powerful macroscopic motions of the atoms with velocities higher than 100 km/sec. The majority of the electrons will move along the neutral plane and will produce a strong bremsstrahlung. Investigation of the γ -radiation of the sun and of the stars by means of artificial satellites would be very interesting. There are 14 references, 10 of which are Soviet.

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On the Formation of Particles of High Energies and
of a Hard Radiation in the Outbursts on the Sun

SOV/20-121-5-14/50

ASSOCIATION: Krymskaya astrofizicheskaya observatoriya Akademii nauk
SSSR (Crimean Astrophysics Observatory, AS USSR)

SUBMITTED: April 23, 1958

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SEVERNYY, A.B.

Abundance of thorium on the sun. Izv.Kryn.astrofiz.obser.
18:96-104 '58. (MIRA 13:4)
(Sun) (Thorium)

SEVERNYY, A.B.

Keenman's attempt to detect deuterium on the sun. Izv.
Krym.astrofiz.obser. 18:105-108 '58. (MIRA 13:4)
(Sun) (Deuterium)

81463

SOV/35-59-8-6359

3.1210
Translation from: Referativnyy zhurnal, Astronomiya i Geodeziya, 1959,
Nr 8, p 38

AUTHORS: Nikulin, N.S., Severnyy, A.B., Stepanov, V.Ye.

TITLE: Solar Magnetograph of the Crimean Astrophysical Observatory

PERIODICAL: Izv. Krymsk. astrofiz. observ, 1958, Vol 19, pp 3 - 19 (Engl.
summary)

ABSTRACT: A device of the Crimean Astrophysical Observatory of AS USSR,
designed for measuring weak magnetic fields is described. The
device is based on the design of Babcock magnetograph (RZhAstr,
1955, Nr 3, 1072). The measurement method is based on the
alternate suppression of the components of magnetically split
absorption lines. It is shown, on the example of the line
5250.218, that the fluctuation of the flux amounts to 0.8% when
this line is split in a field of ~ 10 gauss. A theoretical
analysis of the capacities of FEU VET photomultipliers, employed
jointly with the tower telescope of the Crimean Astrophysical
Observatory, yields ~ 0.2 gauss as a limiting magnitude of

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SOV/35-59-8-6359

Solar Magnetograph of the Crimean Astrophysical Observatory

measurable fields. A 10-m spectrograph with a grid producing the light concentration of the 5th order in the green region (dispersion is 0.2 A/mm) is used in the design of the magnetograph. Two slits, 0.04 A wide each, separated from each other by 0.06 A are located in the spectrograph focal plane. In front of the entrance slit of the spectrograph, there is an electro-optical modulator, a plate of ammonium hydrophosphate cut out perpendicular to the crystal axis. When the voltage (~ 4.6 kv) is fed to the plate, it becomes double-refracting; if the voltage is varied, one can modulate by the circularly polarized signal. In this way, a constant flux Φ with the modulated addition $\delta\Phi$ hits the FEU photocathode through each of the exit slits. Signals from two FEU are fed into a differential amplifier employing a 6N2P tube; the constant components of the anode voltage are mutually compensated in the amplifier, and the modulated (at a frequency of 124 cps) signal is doubled. Then the signal is amplified in narrow-band amplifier (of the 28-IM type) and, after demodulation, is recorded by an EPP-09³ self-recorder. The modulation is performed by an electromagnetic relay which is fed through a phase-inverter from a frequency modulation pickup and which is connected, through an RC filter, to the

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SOV/35-59-8-6359

Solar Magnetograph of the Crimean Astrophysical Observatory

control grids of a differential cathode follower. In distinction from the Babcock magnetograph, the compensator of radial velocities functions automatically. When the lines in the exit slits are displaced, a difference in voltage arises between the FEU anodes. This difference is amplified by the amplifier and gives rise to the rotation of a line-shifter which brings the line back into a symmetric position relative to the slits. The method of adjustment of the device is described. The authors show the reproducibility of recording, the recording at different time constants and different slit heights. The operational slit height is 10 to 30''. An example is presented of the chart of magnetic intensity isolines for a portion of the solar surface.

G.M. Nikol'skiy

Card 3/3

KAZACHEVSKAYA, T.V.; SEVERNYI, A.B.

Hydrogen spectrum of flares. Izv.Krym.astrofiz.obser. 19:
46-71 '58. (MIRA 13:4)
(Spectrum, Solar)

SEVERNYY, A.B.

Excitation and ionization of hydrogen in flares. Izv.Kryn.
astrofiz.obser. 19:72-99 '58. (MIRA 13:4)
(Solar radiation)

SEVERNYY, A.B..

Appearance of flares at neutral points of the solar magnetic field
and the pinch effect. Izv. Krym. astrofiz. obser. 20:22-51 '58.
(SUNSPOTS) (MIRA 13:3)

SOV/169-59-3-2998

Translation from: Referativnyy zhurnal, Geofizika, 1959, Nr 3, p 139 (USSR)

AUTHORS: Severnnyy, A.B., Khokhlova, V.L.

TITLE: On the Polarization of the Continuous Emission in the Active Formations of the Sun ✓

PERIODICAL: Izv. Krymsk. astrofiz. observ., 1958, Vol 20, pp 67 - 73
(Engl. Res.)

ABSTRACT: Twelve of the best spectrograms were used for studying the difference between the polarization of the continuous emission spectrum of the sun's active formations and the instrumental polarization of the spectrum of the surrounding, unexcited atmosphere. It was detected that this difference exceeds considerably the limits of accidental measurement errors, indicating thereby the occasional existence of a polarization of the continuous emission arising in the nuclei of the faculae and near developing sunspots.

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Authors' résumé



SOV-25-58-7-11/56

AUTHOR: Severnyy, A.B., Corresponding Member of the USSR Academy of Sciences, Director of the Crimean Astrophysical Observatory of the USSR Academy of Sciences)

TITLE: None Given

PERIODICAL: Nauka i zhizn', 1958, Nr 7, p 19 (USSR)

ABSTRACT: In 1956, the Crimea observatory received a unique diffraction grating with 600 lines per mm, measuring 150 x 150 mm, with an intensity concentration of the order 4-5, manufactured by the Gosudarstvennyy opticheskiy institut (State Optical Institute). With this, it was possible to discover new phenomena on the solar surface and to investigate the thin structural contours of spectral lines. The excellent properties of the grating permit the examination not only of strong but also of weak magnetic fields on the solar surface (until now

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None Given

SCV-25-58-7-11/56

similar observations have been carried out solely by the Mount Wilson Observatory - USA).

ASSOCIATION: Akademiya nauk SSSR and Krymskaya astrofizicheskaya observatoriya AN SSSR (USSR Academy of Sciences and the Crimea Astrophysical Observatory of the USSR Academy of Sciences)

1. Diffraction gratings--Applications

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SEVERNY, A.B.

"ON THE GENERATION OF COSMIC RAYS IN SOLAR FLARES"

A.B. Severny

1. The observed appearance of solar flares in neutral points of magnetic field and the destruction of fields during flares leads to the concept that a pinch effect underlies flare phenomena.

2. Cosmic rays that appear during flares may be associated with both the action of the Fermi mechanism (reflection of particles from contracting magnetic walls) and the conversion of the energy of the walls into the energy of particles due to rapid deceleration of fields during collision of the walls.

3. It is very important to study the dependence of the character of variations of cosmic radiation during flares on the type of flare, and also bursts of gamma radiation during flares.

report presented at the International Cosmic Ray Conference, Moscow, 6-11 July 1959

3(1)

SOV/33-36-2-2/27

AUTHOR:

Severnyy, A.B.

TITLE:

The Fine Structure of the Magnetic Field and the Depolarization of Radiation in Sunspots

PERIODICAL:

Astronomicheskiy zhurnal, 1959, Vol 36, Nr 2, pp 208-214 (USSR)

ABSTRACT:

The author evaluates photoelectric recordings of magnetic fields of sunspots [Ref 3] carried out with the aid of a solar magnetograph [Ref 2] at high resolving power $\approx 1''$. These recordings show the fine structure of the magnetic field. The observed phenomena: disappearance of the line of sight component, frequent appearance of the Zeeman triplet in umbrae, insensibility of the Zeeman pattern in umbrae against different orientations of the polarizing optics demonstrate the depolarization of the Zeeman pattern, produced by fluctuations of the field and by collisions with hydrogen atoms. Several related questions are considered. Several hypotheses of the author and V. Bumba [Ref 5] are verified.

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Cremean astrophysics observatory, Acad Sci USSR

87358

S/035/60/000/012/016/019
A001/A001

3,1540 (1062,1128,1168)

Translation from: Referativnyy zhurnal, Astronomiya i Geodeziya, 1960, No. 12,
p. 53, # 12295

AUTHOR: Severnyy, A. B.

TITLE: An Investigation of Spectra of Intense Chromospheric Flares

PERIODICAL: Izv. Krymsk. astrofiz. observ., 1959, Vol. 21, pp. 121-151 (English
summary)

TEXT: The wings of Balmer emission in great flares (intensity ≥ 2) consist of the dense clustering of individual whiskers, sometimes asymmetrical. Whiskers are characteristic for the phase of flare development, and their asymmetry gives rise to an apparent depression of one of the far wings. The author measured the profiles of Balmer emission wings during 6 intense flares and, in some cases, the profiles of H and K-lines; the profiles in a flare over limb No. 2459 are of a special interest. It is shown that distribution of emission in far wings of the Balmer series in intense flares strongly deviates from that in the case of the Stark effect, even if an anomalous high value of N_2 , the number of atoms in the second quantum state, is assumed. On the contrary, the observed distribution of

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An Investigation of Spectra of Intense Chromospheric Flares

emission in the wings agrees well with expansion in the case of Doppler effect. The processing of whisker spectra without flares leads to the same result. The slope of the straight lines in the coordinate system $\lg \Delta \lambda$, versus $\Delta \lambda^2$ makes it possible to determine $\Delta \lambda_D$. It is shown that the value of $\Delta \lambda_D / \lambda$ found in this way is practically constant for the entire Balmer emission, as well as for the H and K-lines. This indicates that emission of the far wings of the Balmer series and the H and K-lines in intense flares (originating in the "nucleus" of the flare), as well as the emission of the whiskers, is expanded in consequence of the Doppler effect, macroscopic motions of atoms with velocities of 80-250 km/sec. An analysis of the profiles of the D_3 emission line during flares indicates a very strong self-absorption in this line and a very sharp growth of $p\lambda$ in the depth of the flare (the number of orthohelium atoms at the periphery of the flare is probably more than 2×10^{13}). The line of parahelium $\lambda 3964.73$ is noticed in emission of flares. The study of this line profile leads to the estimate of turbulent velocity at the flare periphery as being $\xi_t = 15$ km/sec. An essential part played by electronic impact in the excitation of helium in flares is noted. There are 11 references.

Author's summary

Translator's note: This is the full translation of the original Russian abstract.

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SEVERNYY, Andrey Borisovich,

"Transient Velocity Fields - solar."

report presented at the 4th Symposium on Cosmical Gas Dynamics, Varenna, Italy,
18-30 August 1960.

3.1250

78004
SOV/33-37-1-4/31

AUTHORS: Severnyy, A. B., Steshenko, N. V., Khokhlova, V. L.

TITLE: The Spectroscopy of Solar Flares With an Echelon Grating

PERIODICAL: Astronomicheskii zhurnal, 1960, Vol 37, Nr 1,
pp 23-31 (USSR)

ABSTRACT: An echelon grating was constructed in 1959 by F. M. Gerasimov of the GOI (State Optical Institute). The steps of the echelon are of thickness $t = 0.0120$ mm and width $s = 0.0147$ mm, making 50 lines per mm for light incident normal to the steps; then, if m is the order of the interference spectrum, and λ is the wave length, $m = 2t/\lambda$. With the spectrograph of the Krym Astrophysical Observatory this gives a dispersion three times greater than is necessary; to correct this the camera mirror with a focal length $1/3$ of the original one was substituted.

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